

Given the points A(-3, c) and B(2, 4), find the value of c such that

1) the line through these points is parallel to the line  $2x - y = 1$

$$\begin{aligned} -y &= -2x + 1 \\ y &= 2x - 1 \\ m &= 2 \end{aligned}$$

$$\begin{aligned} 1/m &= 2 \\ 2 &= \frac{c-4}{-3-2} \\ -10 &= c-4 \\ -6 &= c \end{aligned}$$

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - c &= 2(x + 3) \\ 4 - c &= 2(2 + 3) \\ 4 - c &= 10 \\ c &= -6 \end{aligned}$$

2) the line through these points is perpendicular to  $2x - y = 1$

$$c = \frac{13}{2}$$

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3) the distance between A and B is  $5\sqrt{2}$

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ 5\sqrt{2} &= \sqrt{(2 + 3)^2 + (4 - c)^2} \\ 5\sqrt{2} &= \sqrt{25 + (4 - c)^2} \end{aligned}$$

$$\begin{aligned} (4 - c)^2 &= 25 \\ 4 - c &= \pm 5 \\ c &= 9, -1 \end{aligned}$$

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$$\begin{array}{l}
 5\sqrt{2} \quad \sqrt{25 + (4-c)^2} \\
 50 = 25 + (4-c)^2 \quad | \quad 0 = c^2 - 8c - 9 \\
 \quad \quad \quad \quad \quad \quad \quad | \quad 0 = (c-9)(c+1)
 \end{array}$$

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